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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,911	07/15/2003	Bing Ji	06438 USA	7165

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AIR PRODUCTS AND CHEMICALS, INC.  
PATENT DEPARTMENT  
7201 HAMILTON BOULEVARD  
ALLENTOWN, PA 181951501

EXAMINER
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TRAN, BINH X

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/619,911

Applicant(s)

JI ET AL.

Examiner

Binh X. Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 9-15 and 17-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-25 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7-15-03; 4-11-05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of Group I (composition claims) Species 8 (diacyl fluoride) in the reply filed on 5-12-2005 and 8-22-2005 is acknowledged. The traversal is on the ground(s) that the examiner fails to establish that a serious burden would exist. This is not found persuasive because searching and examining both group I (composition) and group II (method) claims certainly create serious burden on the examiner because of separate status in the art. Further searching and examining plurality of distinct species will create serious burden on the examiner. Therefore, the examiner still maintains the species restriction on the Markush group is proper because each species are distinct from one another.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 20-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 5-12-2005.

3. Claims 9-15, 17-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 8-22-2005.

### ***Claim Objections***

4. Claim 1 is objected to because of the following informalities: In line 4-5 of claim 1, the phrase "a hydrocarbyl group having a number of carbon atoms ranging from 1 to 5" appears twice. The examiner suggests deleting this phrase one time in order to avoid duplicate. Appropriate correction is required.

5. Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 1 is a product claim (i.e. composition or mixture). In claim 1 applicants disclose the intended use of the etching mixture (i.e. "etching dielectric material) in the preamble. In claim 8, applicants further disclose the specific dielectric material of the intended use for the etching mixture. According to the MPEP 2110.02, "If the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction". In claim 8, applicants clearly recite the intended use. As discussed above, the examiner does not give any patentable weight on the intended use. Thus, claim 8 fails to further limit the subject matter of the mixture in claim 1.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The dependent claim 7 contains a limitation (i.e. "99% by volume of the oxidizer") that is contradicted with the independent claim 1. In claim 1 that applicants disclose the ratio by volume of the oxidizer to the unsaturated oxygenated fluorocarbon range from 0:1 (minimum) to 1:1 (maximum). Base on this information, any person having ordinary skill in the art would be able to calculate volume percentage of oxidizer. The minimum volume percentage of oxidizer is 0%. The maximum volume percentage of oxidizer is  $1 / (1+1) = 50\%$  by volume. Once the applicants implicitly disclose the maximum percentage of oxidizer is 50%, applicants cannot recites a new contradicted limitation that includes a percentage value greater than 50% such as 99% by volume of the oxidizer in claim 7.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-2, 4-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Misra (US 6,242,359).

Respect to claim 1, Misra discloses an etching composition comprising an unsaturated fluorocarbon comprising  $(\text{COF})_2$  (col. 5 lines 19-20).

It is noted that the compound  $(\text{COF})_2$  can be re-written as  $\text{C}_2\text{F}_2\text{O}_2$ . The compound  $\text{C}_2\text{F}_2\text{O}_2$  read on the formula  $\text{C}_x\text{F}_y\text{O}_z\text{R}_q$  wherein  $x = 2$ ,  $y = 2$  (less than  $2x-q$ ),  $z = 2$ ,  $q = 0$ . Since  $q = 0$ , the examiner can interpret that R is a hydrogen atom, hydrocarbaryl group or a halohydrocarbaryl group.

Respect to claim 2, Misra discloses the mixture comprise inert gas such as argon or nitrogen (col. 6 lines 33-35). Respect to claim 4, Misra discloses the unsaturated oxygenated fluorocarbon is ethers (col. 5). Respect to claim 5, Misra discloses the oxidizer is at least one selected from the group consisting of ozone, oxygen, nitrous oxide ( $\text{N}_2\text{O}$ ) (col. 6 lines 45-47).

Respect to claim 6, Misra discloses the flow rate of the unsaturated oxygenated fluorocarbon (non-global warming compound) is 50-200 sccm. Misra further discloses the ratio of oxygen to non-global warming compound is 0:1 to 2:1 (col. 7 lines 40-45). When the flow ratio of oxygen to non-global warming compound (i.e. unsaturated oxygenated fluorocarbon ) is 2:1, the percentage of unsaturated oxygenated

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fluorocarbon equal to 33.33% (Note:  $1/(1+2) * 100\% = 33.33\%$ ; within applicants' range of 1 to 99%).

Respect to claim 7, Misra discloses the oxidizer is an optional (col. 6 lines 39-45, read on 0 to 99%). Respect to claim 8, Misra discloses the dielectric material comprises silicon oxide, silicon nitride or silicon oxynitride (col. 8 lines 53-54).

10. Claims 1-2, 4-5, 7-8, 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Mimura et al. (US 2004/0097079).

Respect to claim 1, Mimura discloses an etching composition comprising an unsaturated fluorocarbon comprising  $C_xF_yO_z$  includes  $C_3F_4O_2$  (paragraph 0058-0059). The compound  $C_3F_4O_2$  read on the formula  $C_xF_yO_zR_q$  wherein  $x = 3$ ,  $y = 4$  (less than  $2x - q$ ),  $z = 2$ ,  $q = 0$ . Since  $q = 0$ , the examiner can interpret that R is a hydrogen atom, hydrocarbaryl group or a halohydrocarbaryl group.

Respect to claim 2, Mimura discloses the mixture comprise inert gas such as argon or helium (paragraph 0068-0069). Respect to claims 4 and 16, Mimura discloses the unsaturated oxygenated fluorocarbon is a diacyl fluoride having the formula  $C_3F_4O_2$ , wherein  $x = 3$ ,  $y = 4$  (less than  $2x - q$ ),  $z = 2$  and  $q = 0$ ; or having the formula  $C_4F_6O_2$ , wherein  $x = 4$ ,  $y = 6$  (less than  $2x - q$ ),  $z = 2$  and  $q = 0$  (paragraph 0059). Respect to claim 5, Mimura discloses the oxidizer is at least one selected from the group consisting of oxygen (col. paragraph 0068).

Respect to claim 7, Mimura discloses the oxidizer is an optional by indicating any of these gases may be used alone or a plurality of gases among these gases may be

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used in a mixture (paragraph 0051; read on 0%). Respect to claim 8, Mimura discloses the dielectric material comprises silicon dioxide (col. paragraph 0090).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Misra.

Respect to claim 3, Misra fails to disclose the specific volume percentage of inert diluent gas. However, Misra clearly teaches to use inert diluent gas. Misra further discloses that the flow rate of each individual gas is a result effective variable by varying the flow rate(col. 7). The volume percentage for each gas depends on the gas flow rate. Therefore, the examiner interprets that Misra implicitly teaches volume percentage is a result effective variable. The result effective variable is commonly determined by

routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiments to obtain optimal volume percentage as an expected result.

14. Claims 3, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mimura.

Respect to claim 3, Mimura fails to disclose the specific volume percentage of inert diluent gas or unsaturated oxygenated fluorocarbon. However, Mimura clearly teach to use inert diluent gas and unsaturated oxygenated fluorocarbon. Mimura further discloses that the flow rate ratio is a result effective variable. The volume percentage for each gas depends on flow rate ratio. Therefore, the examiner interprets that Mimura implicitly teaches volume percentage is a result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiments to obtain optimal volume percentage for each gas as an expected result.

### ***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Binh Tran*

Binh X. Tran